

**Governor's Water Augmentation,
Innovation, and Conservation Council
Post-2025 AMAs Committee
August 10, 2021**



Agenda

- I. Welcome
 - a. Updates Since Last Meeting
 - b. Overview of Solutions Phase
- II. ADWR Presentation on Unreplenished Groundwater by Sector
- III. Discussion of Potential Concepts to Address Unreplenished Groundwater Withdrawals
- IV. Next Steps
- V. Adjournment



Webinar Logistics

- Please state your name when speaking.
- Mute yourself when not speaking.
- Indicate you wish to speak by typing your name in the chat box, and you will be invited to unmute and speak.
- Please message “Everyone” in the chat.
- The meeting and chat will be recorded.

Technical issues? Send a **direct message** to **ADWR-Host** in the chat, call the ADWR Help Desk at 602-771-8444 or email tickets@azwater.gov.



An aerial photograph showing a vast landscape of agricultural fields in various shades of green and brown, separated by a network of roads and a multi-lane highway. In the distance, a range of mountains is visible under a clear sky. A semi-transparent circular overlay is positioned on the left side of the image, containing the title and list.

Timeline

Presentations plus Discussion of Ideas

- June 22nd – Groundwater in the Assured Water Supply Program
- August 10th – Unreplenished Groundwater Withdrawals
- September 9th – Hydrologic Disconnect
- GWAICC September 16th – Committee Update on Solutions Development

Timeline

- October through December – Fine-tune most realistic, supported strategies and solutions
- GWAICC December 9th – Present general-consensus proposals
- 2022 – Continue discussion to develop additional strategies and solutions

An aerial photograph of a suburban neighborhood with a large circular overlay on the left side. The overlay contains the title 'Pinal AMA' and a list of two bullet points. The background shows a residential area with many houses, a dirt road, and a blue water tank. In the distance, there are hills and mountains under a clear sky.

Pinal AMA

- **ADWR will not approve new assured water supply application that utilize groundwater in the Pinal model domain**
- **Non-groundwater importation and direct delivery supplies must be used for new assured water supply determinations**

An aerial photograph of a town, likely Flagstaff, Arizona, showing a mix of residential and commercial buildings, a baseball field, and a large parking lot. The town is surrounded by dense green forests and mountains in the background under a blue sky with some clouds. A large, semi-transparent white circle is overlaid on the left side of the image, containing the title and bullet points.

Management Plan Periods

- GWAICC to look at new management periods for AMAs
- What should be the timeframe for 6th Management Period?

Unreplenished Groundwater Withdrawals in the AMAs, by Sector: Background

Post-2025 AMAs Committee



*Jenna Norris, Governor's Water Council Coordinator
Arizona Department of Water Resources*

*Natalie Mast, AMA Director – Management Plans
Arizona Department of Water Resources*

Roadmap for Today's Presentation:

1) Definitions, Background and Data

- Relationship between Groundwater Demand and Offsets to Groundwater Demand
- Revisiting Average Unreplenished Groundwater Demand Table in Issue Brief
- Putting the Data into Context

2) Data Dashboard – Total Demand vs Total Recharge/Replenishment



Unreplenished Groundwater: Definitions & Background



Unreplenished Groundwater: Definition

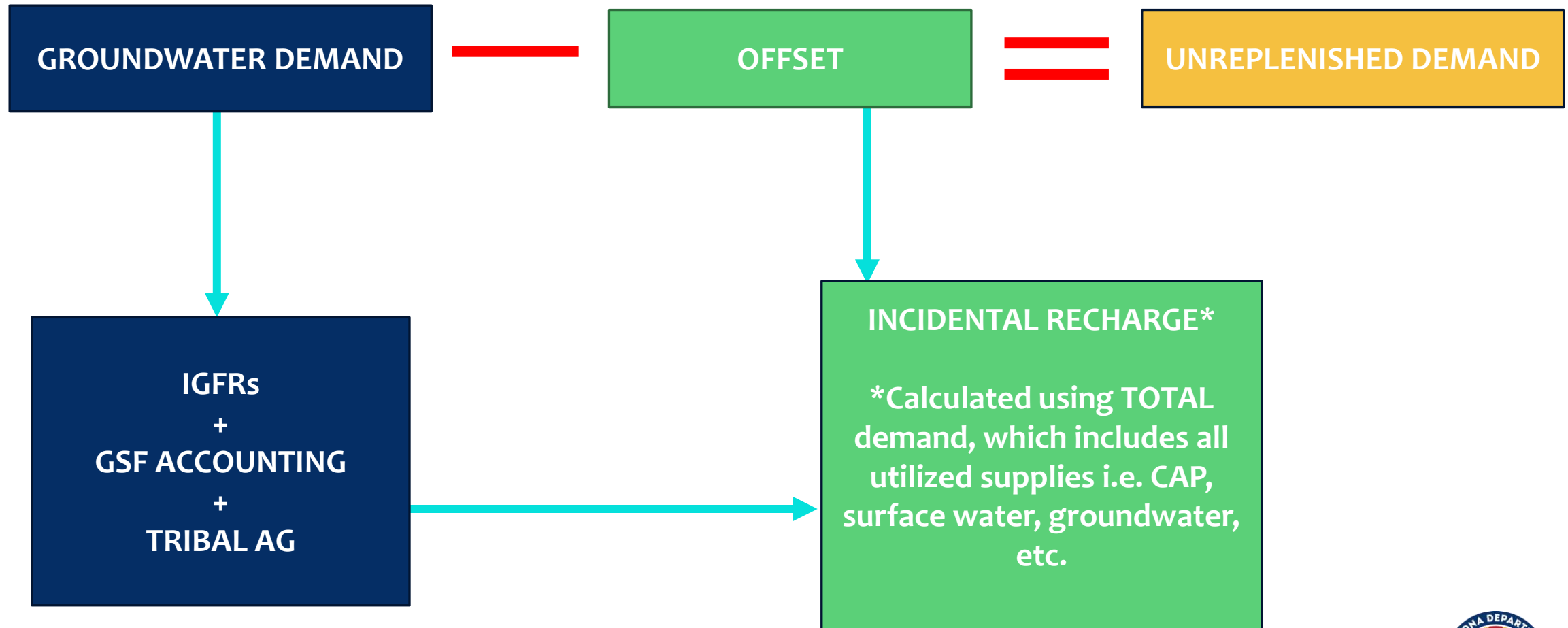
* Unreplenished groundwater is:

- **Groundwater demand without requirement or obligation to artificially replenish or replace that volume of water back into the aquifer**
- **is not offset by incidental recharge/replenishment**

Existing groundwater use was grandfathered into the 1980 Groundwater Management Act (Code), as well as other exceptions that **allow for the use of unreplenished groundwater across all sectors.**



Agriculture Sector Unreplenished Demand Equation



Agriculture Groundwater Demand: Overview

- The agriculture sector is **not required to replenish**
- The agriculture sector is **subject to mandatory conservation requirements** aimed to reduce the amount of groundwater used over time
- Groundwater withdrawals from this sector can be **expected to continue for as long as the land is used for agricultural purposes**



Credit: UA CALS

Agriculture Sector Unreplenished Demand Equation

GROUNDWATER DEMAND

OFFSET

UNREPLENISHED DEMAND

IGFRs

+

GSF ACCOUNTING

+

TRIBAL AG

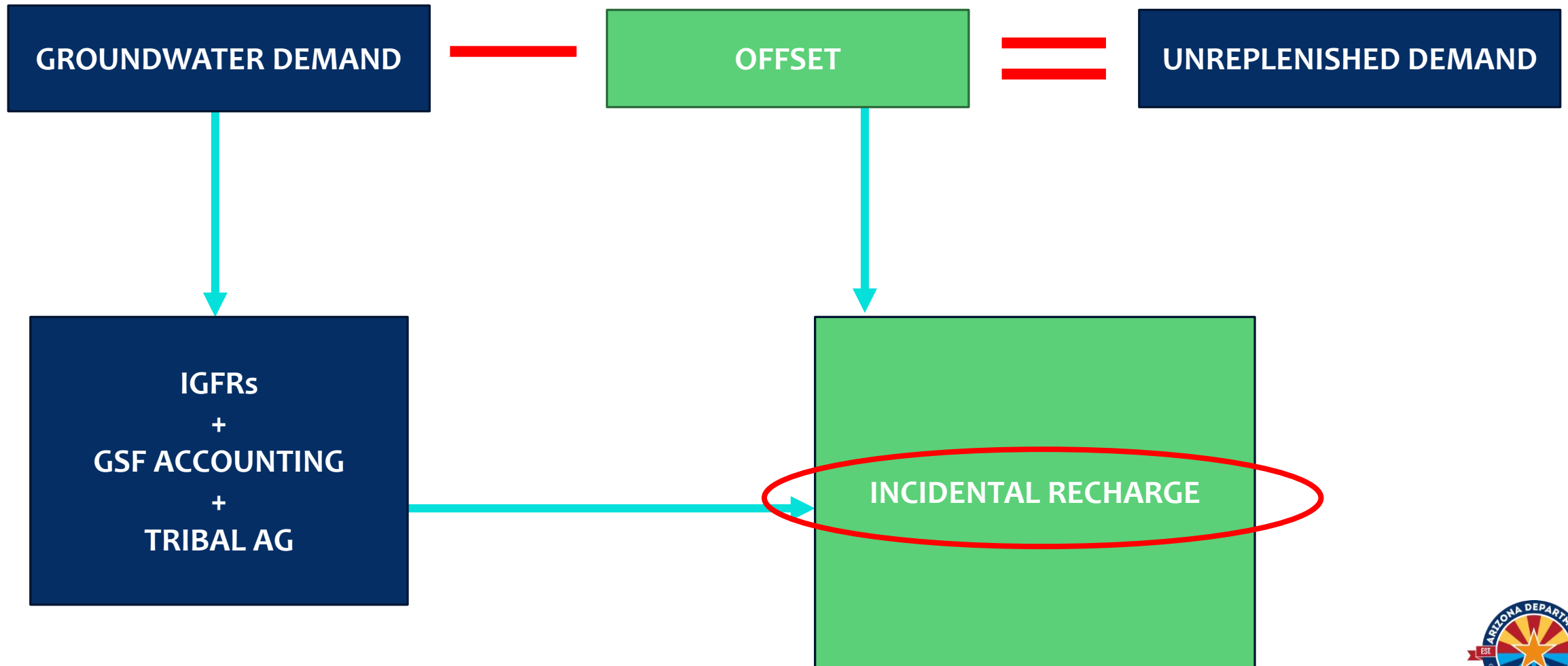
INCIDENTAL RECHARGE*

IGFRs

Irrigation Grandfathered Rights (IGFR): The authority to withdraw groundwater for irrigation use, in perpetuity, **without a replenishment requirement**

- **Limited to the groundwater allotment** of each right*
- **No new IGFRs may be created** and land that may be irrigated is limited to that which was historically irrigated between January 1, 1975, and January 1, 1980

Agriculture Sector Unreplenished Demand Equation



Incidental Recharge (IR) for Agriculture Sector

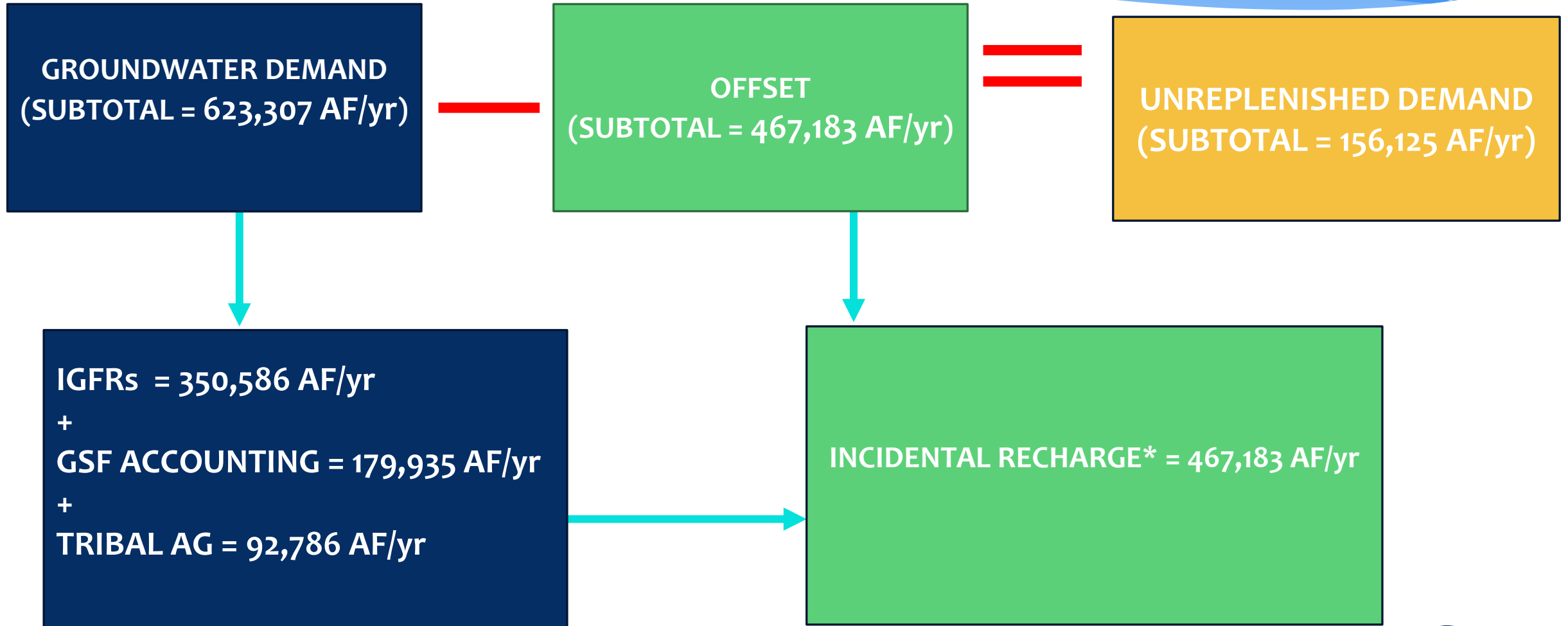
The Agriculture Sector does not have a replenishment requirement, but some replenishment, **referred to as incidental recharge**, is assumed to occur **after water is applied to crops and percolates below the root zone to reach an aquifer.**

AG IR CALCULATION?

- * **Output of ADWR's regional GW models**
- * Current method differs from other sectors
- * Municipal & Industrial Incidental Recharge are calculated as a percent of total sector demands



Ag Sector 5-year Avg Unreplenished Demand for PHX AMA



Agriculture Sector Demands in Context for PHX AMA

- **Approx. 3/4** of the **Agriculture Sector's** Groundwater Demand is **offset** by **Incidental Recharge**
 - **Approx. 1/4** of the **Agriculture Sector's** Groundwater Demand is **Unreplenished** Groundwater Demand
- * The Agriculture Sector's unreplenished groundwater demand contributes **~>4/10th** of the total **unreplenished groundwater demand** for the PHX AMA.



Agriculture Sector: More on IGFRs in PHX AMA

5-year avg (using years 2012-2016)	
Sum of Allotment Quantity* (AF/yr)	Sum of Flex Account Balances* (AF/yr)
479,016	4,373,813

As part of the Agricultural Conservation Program, those **IGFRs operating under the Base Program also have a flexibility account.**

- To allow for varying climatic and market conditions, IGFRs can borrow or bank groundwater from year to year

- Flex credits are **cumulative with no upper limit** on the number of credits that can be obtained
- ***Can be used at any time to supply more water to a crop than what is allotted to the IGFR***

**only for those IGFRs belonging to the Base Program*

Agriculture Sector: More on IGFRs in PHX AMA

IGFRs belonging to the Base Program (2018)	
Sum of Water Use* (AF/yr)	Sum of Allotment Quantity* (AF/yr)
470,591	476,730.01

Ratio Between Sum of Water Use/Sum of Allotment Quantity = 0.99

**only for those IGFRs belonging to the Base Program*

IGFR Allotments, Flex Credits, and Groundwater Demand in Context for PHX AMA

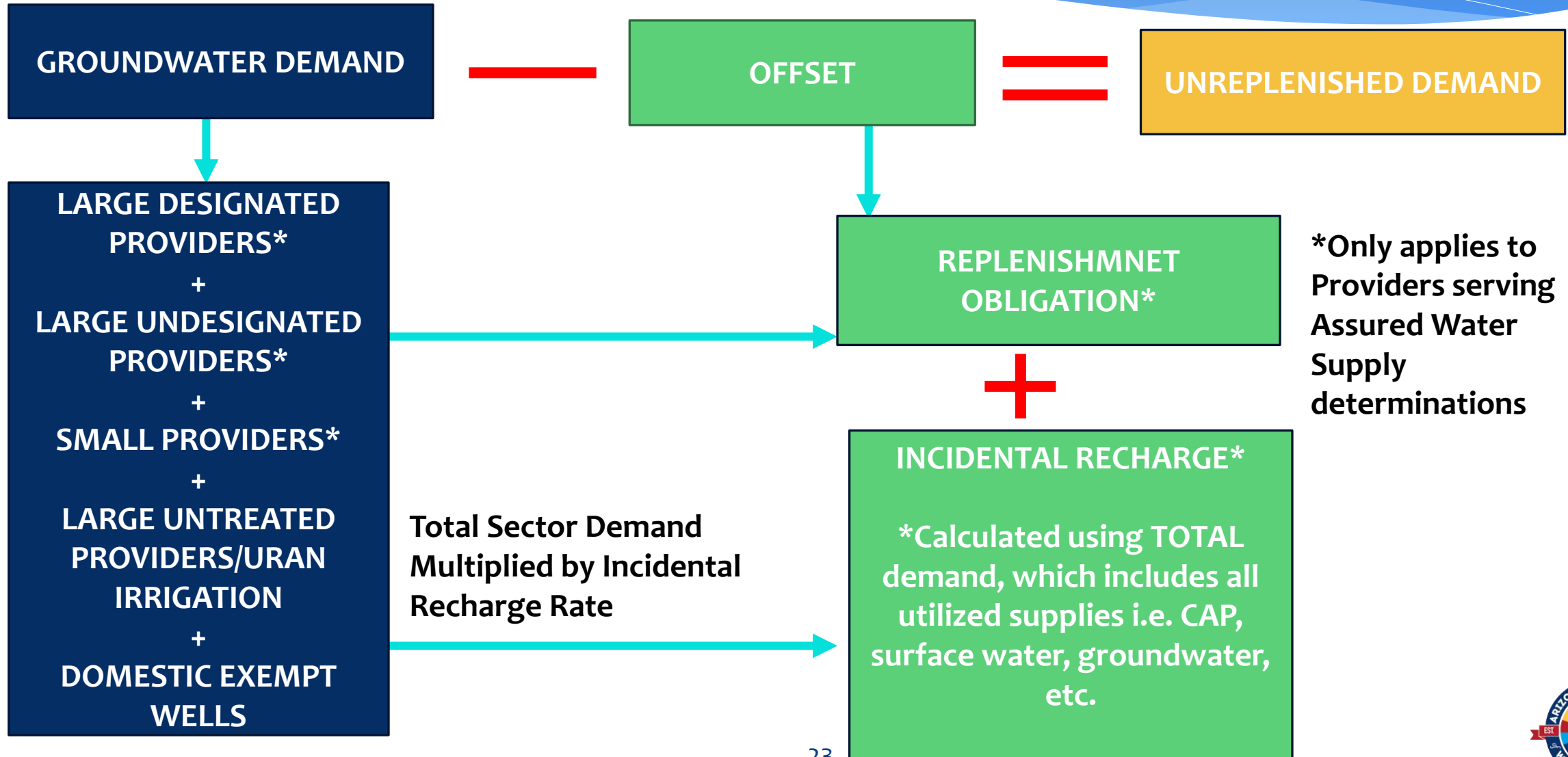
- The ratio of the **sum of flex account balances** to the **sum of allotment quantity** is just under 10. In practice, this means that for the PHX AMA, IGFR holders could utilize flex credits alone*, for just under 10 years, and still fulfill the full allotment amounts.

Significance?

Both the Total Allotment Quantity and Flex-credits represent **potential future groundwater demand** that is **not subject to a replenishment obligation**



Municipal Sector Unreplenished Demand Equation

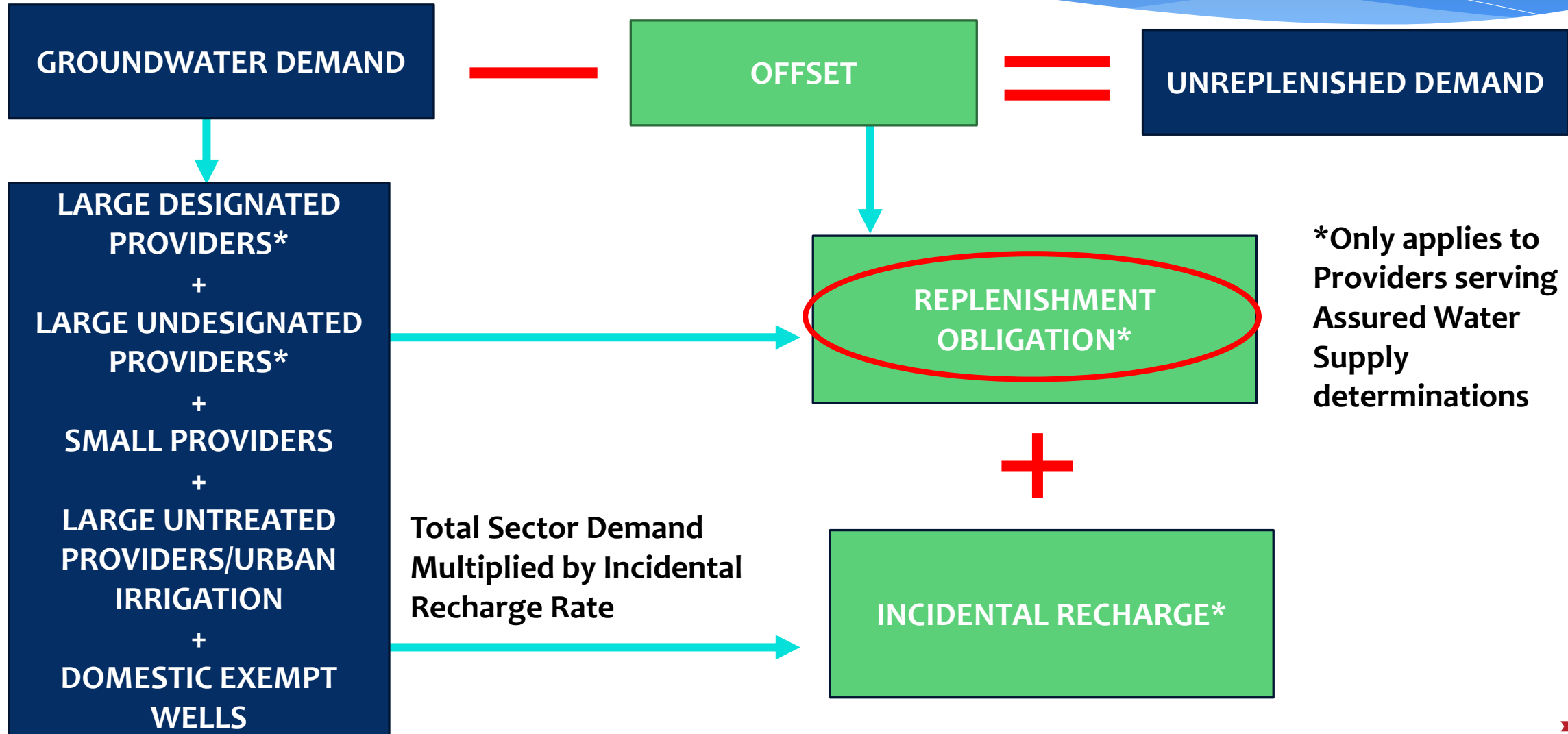


Municipal Groundwater Demand: Overview

- The municipal sector is **required*** to demonstrate **consistency with the management goal** under the Assured Water Supply (AWS) Program
 - **Existing municipal groundwater uses are exempt** from this requirement*
- The municipal sector is **subject to mandatory conservation requirements** aimed to reduce the amount of groundwater used over time.



Municipal Sector Unreplenished Demand Equation



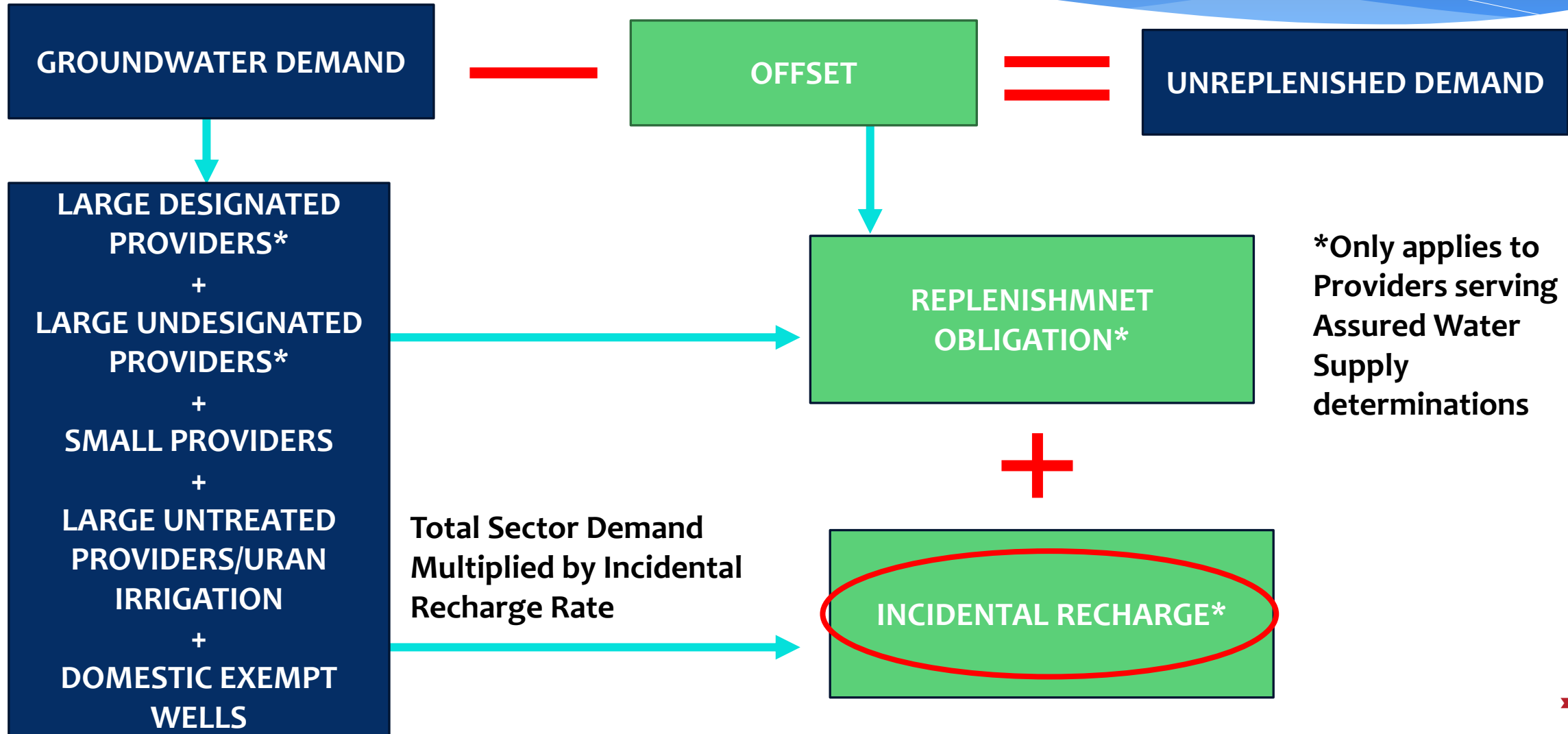
Replenishment Obligation

Assured Water Supply Criteria requires that the water supply must be consistent with the management goal of the AMA

- Broadly, this requires a provider to attempt to achieve and maintain a **long-term balance between the groundwater withdrawn and the groundwater recharged annually**, achieved by **replenishing or offsetting groundwater withdrawals**
- **Groundwater Allowance** : under the AWS rules, a **predetermined volume of groundwater that can be withdrawn** by the Designated provider or by the Certificate of Assured Water Supply holder, **without being replenished or offset**



Municipal Sector Unreplenished Demand Equation



Incidental Recharge (IR) for Municipal Sector

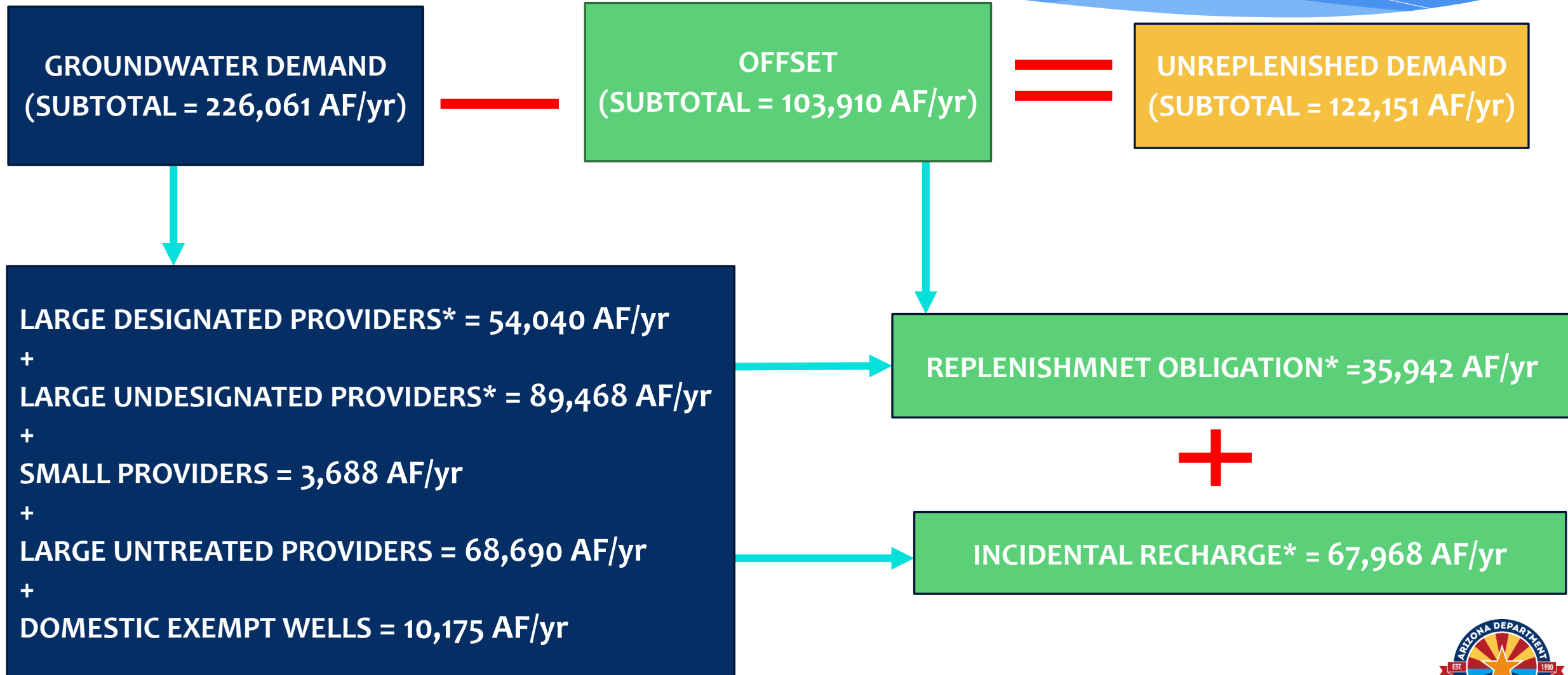
In addition to the replenishment requirement for those providers serving AWS demands, the total muni sector groundwater demand is also offset by **incidental recharge**.

MUNICIPAL IR CALCULATION?

- * Municipal Incidental Recharge is **calculated as a percent of total sector demands**
- * For the purposes of safe yield, the IR rate is based on the 4% standard established in AWS

Rules

Muni Sector 5-year Avg Unreplenished Demand for PHX AMA



Municipal Sector Groundwater Demand in Context for the PHX AMA

- A little less than 1/2 of the Municipal Sector's Groundwater Demand is offset by Replenishment + Incidental Recharge
- A little more than 1/2 of the Municipal Sector's Groundwater Demand is Unreplenished Groundwater Demand
 - * The Municipal Sector's unreplenished groundwater demand contributes ~3/10th of the total unreplenished groundwater demand for the PHX AMA

Closer Look at Groundwater (GW) Allowances in PHX AMA

Groundwater Allowance = [**Starting Balance** (assigned at the time AWS designation was issued) + **Incidental Recharge Rate** (ranges from ~4%-6% for PHX) + **Extinguishment Credits**] – [**Non-Exempt Groundwater Pumping***]

*Pumping that occurs pursuant to any of the following withdrawal rights is **exempt** and is **not accounted for as Groundwater Pumping**: Long-Term and Annual Credits Recovered, Poor Quality Water Exemption, & Drought Exemption

Closer Look at Groundwater Allowances in PHX AMA

Designated Providers in PHX AMA (2019)

Sum of Groundwater Allowances (AF)	Sum of Replenishment Obligation (AF)	Sum of Non-Exempt Groundwater Pumping (AF/yr)	Sum of Incidental Recharge (IR) Rate (AF/yr)
4,048,335	7,627	53,567	40,609

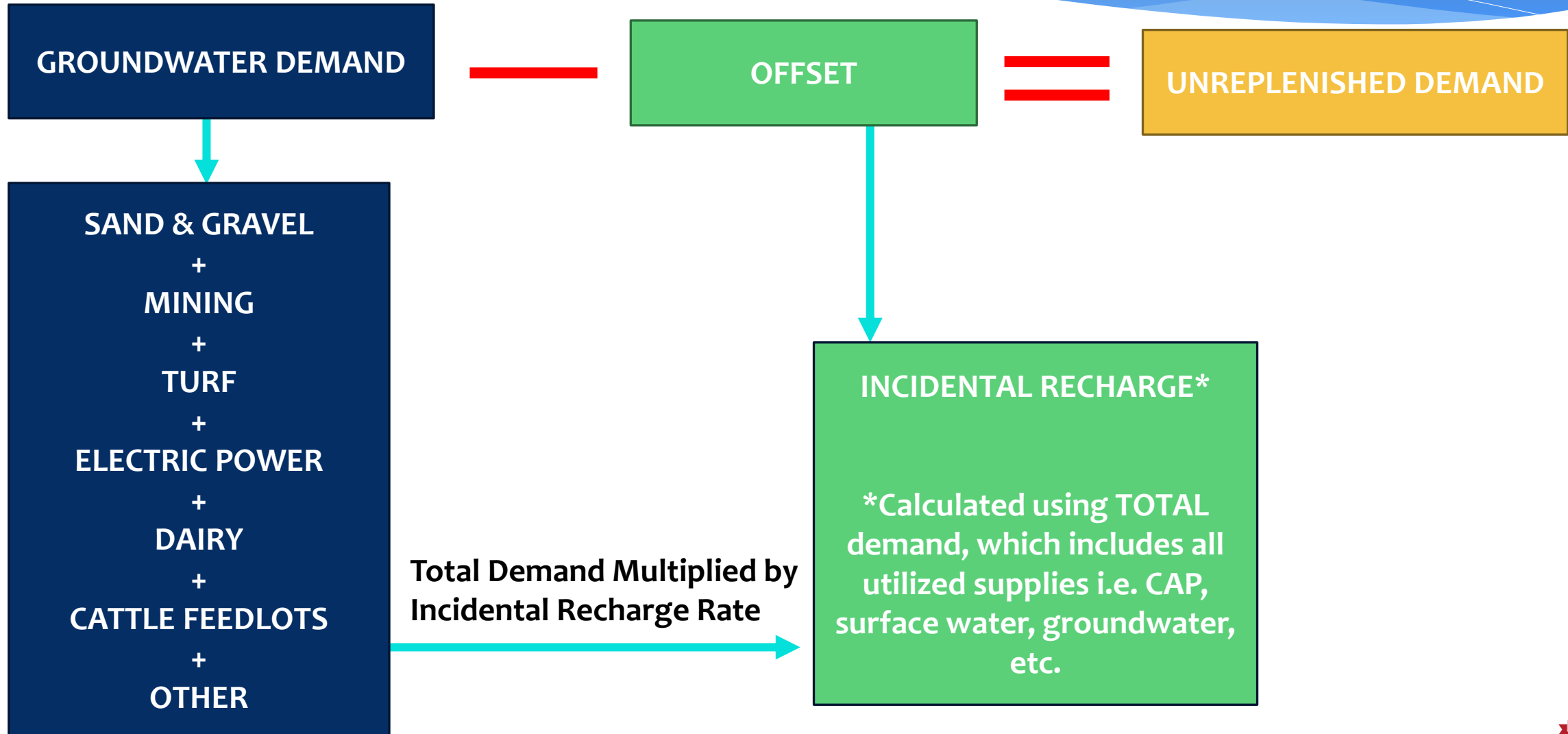
Certificates in PHX AMA Within CAGRD Member Lands (2019)

Sum of Pre-Report Groundwater Allowances (AF)	Sum of Replenishment Obligation (AF)
461,788	18,761

GW Allowance, Replenishment Obligation, Incidental Recharge and Groundwater Demand in Context for PHX AMA.

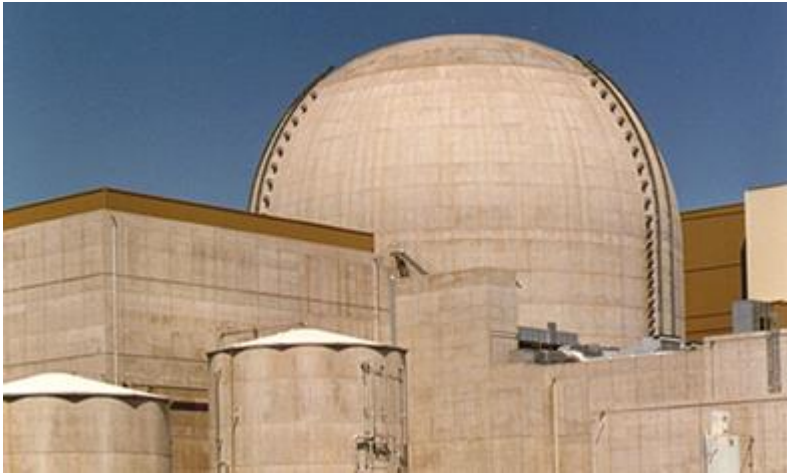
- Of the 15 Designated Providers within the PHX AMA, **just under half** have a groundwater allowance with a **net positive % change**
 - 1 Designated Provider had a replenishment obligation in 2019
- **Approx. 3/4** of the total amount of **groundwater pumping subtracted** from the GW allowance **for 2019** will be **replaced and added back** into the balance **for 2020** due to the **incidental recharge** rate
- **Significance?**
- The **replenishment obligation** for the municipal sector only accounts for **16%** of the **muni sector's groundwater demand**
- Current and future **replenishment obligation** is **directly tied to existing groundwater allowances**

Unreplenished Groundwater: Industrial Sector



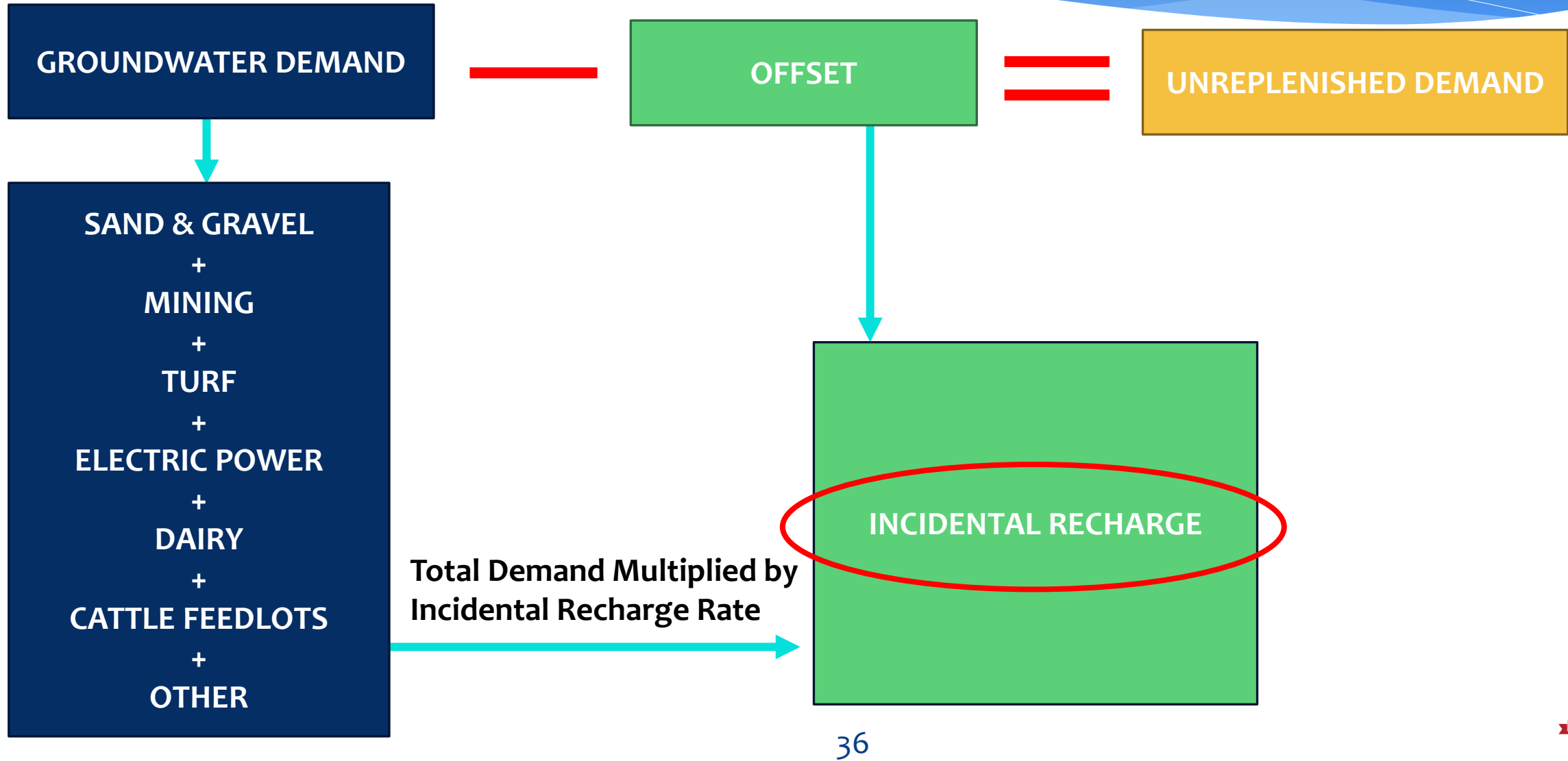
Industrial Groundwater Demand: Overview

- The Industrial Sector is **not required to replenish**
 - The Industrial Sector is **subject to mandatory conservation requirements** aimed to reduce the amount of groundwater used over time
 - Groundwater withdrawals from this sector can be **expected to continue and grow** alongside municipal growth as the two sectors are interdependent



Credit: APS

Unreplenished Groundwater: Industrial Sector



Incidental Recharge (IR) for Municipal Sector

INDUSTRIAL IR CALCULATION?

The Industrial Sector does not have a replenishment requirement, but some replenishment, **referred to as incidental recharge**, is assumed to occur.

- * This sector includes electric power plants, sand and gravel facilities, turf facilities, mining, dairy, cattle feedlots, and other industrial uses.
- * The IR rate applied varies depending on the use, with the total demand from each of those subsets summed to get the IR.



Industrial Sector 5-year Avg Unreplenished Demand for PHX

GROUNDWATER DEMAND
(SUBTOTAL = 107,024 AF/yr)

OFFSET
(SUBTOTAL = 9,149 AF/yr)

UNREPLENISHED DEMAND
(SUBTOTAL = 97,875 AF/yr)

SAND & GRAVEL = 11,311 AF/yr
+
MINING = 30 AF/yr
+
TURF = 58,972 AF/yr
+
ELECTRIC POWER = 11,617 AF/yr
+
DAIRY = 11,216 AF/yr
+
CATTLE FEEDLOTS = 85 AF/yr
+
OTHER = 13,793 AF/yr

Total Demand Multiplied by
Incidental Recharge Rate

INCIDENTAL RECHARGE*
(SUBTOTAL = 9,149 AF/yr)

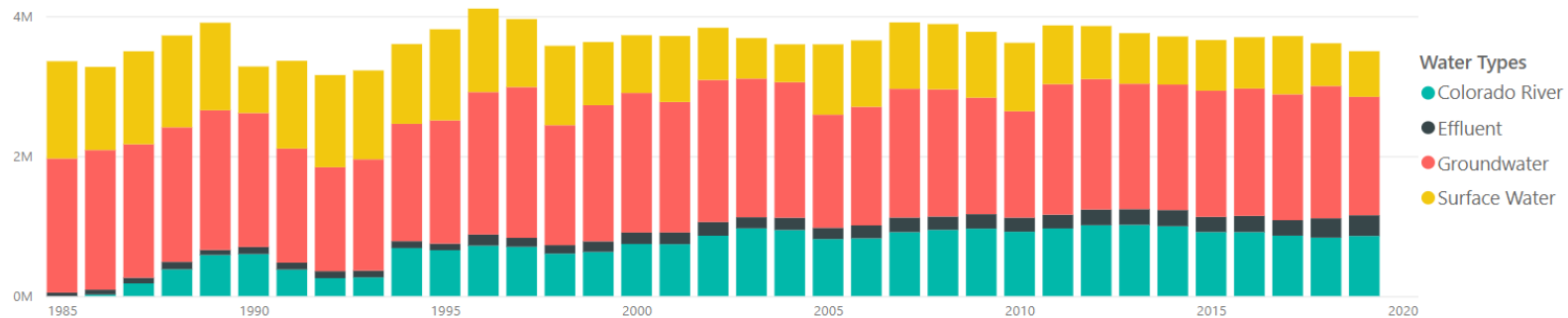
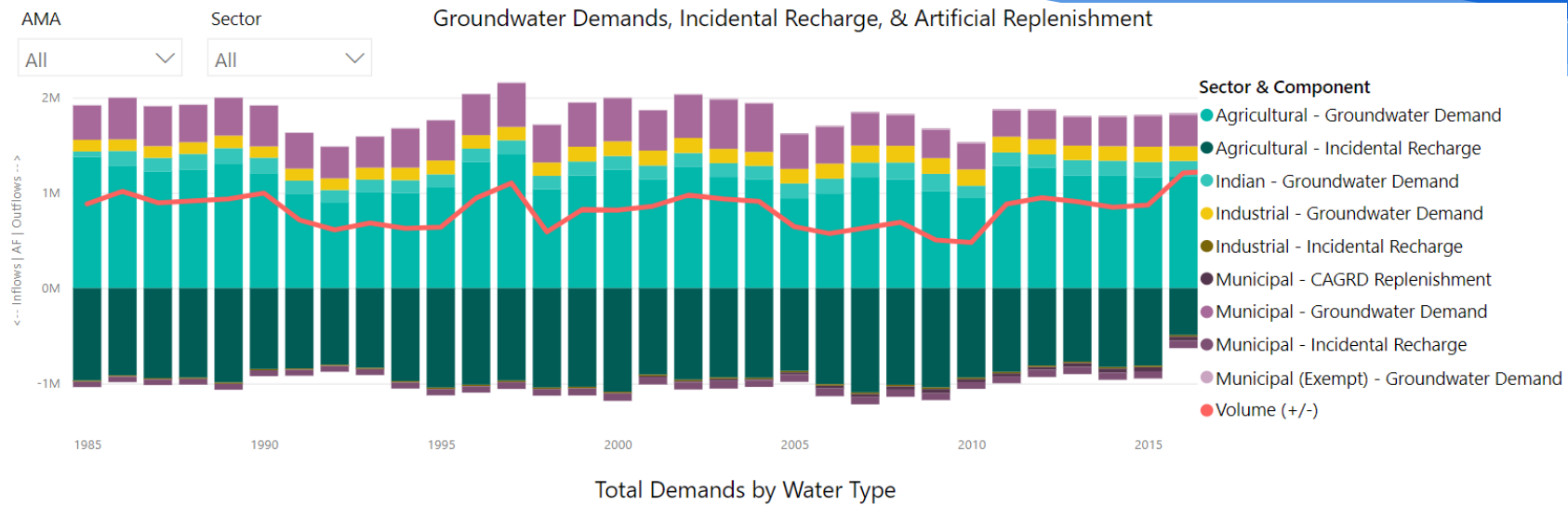
Municipal Sector Groundwater Demand in Context for the PHX AMA

- **Less than 1/10th** of the Industrial Sector's Groundwater Demand is **offset** by Incidental Recharge
- **A little more than 9/10th** of the Industrial Sector's Groundwater Demand is **Unreplenished** Groundwater Demand
 - * The Industrial Sector's unreplenished groundwater demand **contributes ~<3/10th** of the total **unreplenished groundwater demand** for the PHX AMA

Unreplenished Groundwater: Data Dashboard



Dashboard



Dashboard is
available [here](#)
and at
[new.azwater.gov/
gwaicc/post-2025-
amas-committee](http://new.azwater.gov/gwaicc/post-2025-amas-committee)



Questions?

Website:

www.new.azwater.gov

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**PROTECTING
ARIZONA'S WATER SUPPLIES
for ITS NEXT CENTURY**



Discussion